Analyzing Data below Detection Limit or Multiple Detection Limits

Length:	Two-day
Contact Hours:	16
Location:	Sacramento
Cost:	Free to DWR staff
Next Class:	Winter/Spring 2005
Prerequisite:	Knowledge of Introductory Statistics will be assumed
Scope:	Examples from surface water sampling
Class Minimum:	20
Class Max:	30
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Analytical data for some analytes often contain values below the detection or reporting limits (censored data). There are no simple ways of statistically evaluating data below detection limits and it is tempting to change them to zero. **That is not the correct way**! Data with multiple detection limits (because of different methods or dilution) are also problematic. This class will explore the appropriate methods of evaluating these types of data.

Day 1

1. The Many Flavors of Detection Limits
   - How are they computed?
   - Reporting limits, LOQs, PQLs, etc.
   - Trace amounts: there but not quantifiable

2. Less-thans !! How do I….
   - Handle them in my database?
   - Plot them?

3. Overview of Analysis Methods
   - Never delete nondetectsl
   - Why not just substitute values?

- Parametric and nonparametric methods

4. Describing Data
    - What's the mean of several nondetects?
    - How to compute summary statistics
    - What to do for multiple detection limits?
    - What can be done when all are below the detection limit?

5. Hypothesis Tests
    - Do my data exceed a standard?
    - Which group has larger values?
    - What to do for multiple detection limits?

Day 2

6. Testing Three or More Groups
    - Which group has the largest values?
    - How can I show this on a graph?
    - What to do for multiple detection limits

7. Correlation Methods
    - Can I compute a correlation coefficient?
    - What to do when one or both variables has multiple detection limits

8. Regression and Trends
    - How to compute a line with less-thans
    - How to graph this?
    - What to do for multiple detection limits
    - Predicting exceedances